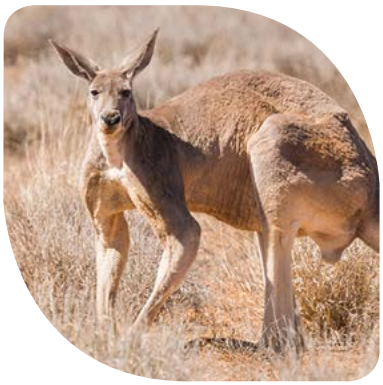
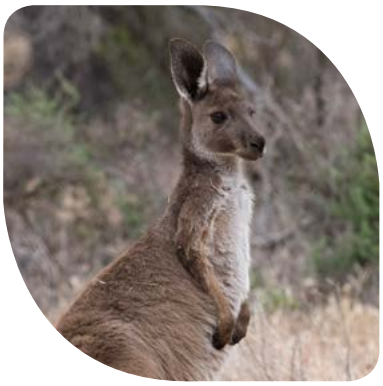
Kangaroo Management in Western NSW

Kangaroos are a widely recognised symbol of Australia. Some kangaroo species are so abundant that the Australian Government has deemed they can be harvested for ecological and land management reasons.
This document will focus on the three species that can currently be harvested in Western NSW: Red kangaroos, eastern grey kangaroos and western grey kangaroos.



Red kangaroo *(Macropus rufus)*

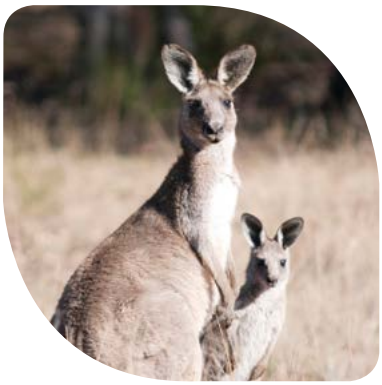
The red kangaroo is the largest living marsupial. Males continue to grow throughout their lives, reaching up to two metres in height and weighing as much as 80-90 kg. They have a top speed of more than 60 km/h and can leap eight metres far and three metres high. Unlike the red/brown males, female reds (or "blue fliers") are a smoky blue grey in colour with a pale under-surface and red/brown tinges around paws. They can grow up to 40 kg but are more commonly 23-30 kg.



Western grey kangaroo *(Macropus fuliginosus)*

Western grey kangaroos are slightly smaller and lighter than eastern greys with males reaching about 50 kg. They are dusty to chocolate brown (often with a black patch around the elbow and dark brown face)

Although eastern and western grey kangaroos are closely related, interbreeding in the wild is rare.



Eastern grey kangaroo *(Macropus giganteus)*

Eastern grey kangaroos are grey-brown in colour with a pale grey face and dark shading around eyes. Eastern grey males grow to 1.5 - 1.8 metres in height and may exceed 70 kg while the females rarely reach 35 kg. Eastern greys can hop as well as the big reds: up to nine metres in one bound, reaching speeds of nearly 50 km/h.

Why do kangaroos need to be managed?

Kangaroos are one of the most abundant wild mammals in the world and the harvestable macropod species are some of the few Australian native animals that have thrived since European settlement. This is particularly true in the pastoral region of western NSW due to the implementation of pastoralism including the proliferation of artificial water points, increased control of wild dogs and a reduction in Aboriginal hunting.

After more than 30 years of kangaroo harvesting in Australia populations of the harvestable kangaroo species are still abundant. Seasonal conditions are the main predictor of kangaroo populations, not harvesting. Their numbers increase significantly in good seasons and decrease dramatically in extended periods of drought. Kangaroo populations in NSW commercial zones peaked in 2016 at 17.4 million (trebling from 5.5 million in 2005) and declining again to 12.8 million in 2018 due to widespread drought.

Most kangaroos in NSW are located on pastoral land and grazing pressure from largely fluctuating kangaroo numbers can significantly inhibit pastoralists' ability to manage landscapes for long term health and production.

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Grazing pressure from kangaroos

All kangaroos are herbivores with grasses and forbs being the main component of their diet, though they will utilise bushes and tree browse when conditions deteriorate. Kangaroos digest through a forestomach fermentative process to break down fibrous vegetation. However, unlike ruminants they do not chew the cud, grinding their food finer before swallowing.

At any one time, the diet composition of macropods, unmanaged goats and livestock is often quite different. However, in rangeland regions all species rely on the same broad groups of forages (annual and perennial grasses, ephemeral and perennial forbs) for the large majority of their feed. Scientific literature tends to indicate that direct competition between macropods and livestock is limited and that kangaroos contribute little to total grazing pressure. However, as feed availability or herbage diversity declines, such as during periods of extended drought, dietary overlap and competition increases. Direct competition becomes more apparent when pasture biomass falls below particular thresholds. Thresholds are estimated as 300 kg/ha in the chenopod rangelands of western NSW but thresholds may be 400 to 500 kg/ha in other rangeland regions.

Dry sheep equivalent (DSE): There has been much research and debate on the DSE that should be attributed to kangaroos. Earlier predictions put the value at about 0.7 but a more conservative estimate is currently being used of 0.35 DSE for all macropods.

Daily dry matter intake (DDMI): When compared on a per kg metabolic body weight basis, the DDMI of average sized macropods is estimated to be around 0.46 – 0.49 of that of sheep when fed a low fibre forage such as young grass leaf. However, when forage contains high levels of fibre, such as grass stems, macropods of similar size consume similar amounts to sheep. Macropods also have the capacity to substantially increase their DDMI by expanding their gastro-intestinal tracts, meaning their food intake rates fall less slowly than ruminants who require a longer passage time with high fibre diets.

Kangaroos are likely to eat the dry stems of perennial grasses for longer than sheep, goats or cattle as browse is less attractive to them, and will even dig up and eat grass bases and roots before switching to browse.

Macropods are also generally more mobile than domestic stock and are able to take advantage of patchy and localised growth of grasses and ephemeral forbs resulting from isolated rain events. In addition kangaroos can access pastures where domestic stock have been removed to allow for rest and recovery. Accounting for kangaroo grazing is a major issue for landholders trying to budget feed and manage landscapes for long term health and production.

Home Range, habitat and access to water

Individual kangaroos are generally sedentary; their activities are usually confined to familiar areas known as home ranges; the areas traversed by kangaroos in their normal activities of feeding, mating and caring for young. Males tend to have the largest home ranges although seasonal changes in food supply can lead to significant expansion of home ranges when temperatures are hot and forage is dry. Home ranges will expand for forage rather than contracting to water.

Kangaroos are highly efficient and get most of their water through food. Red kangaroos are particularly economical and only need to drink every week or two in summer. In cooler seasons, they may not need to drink for many months.

Research has shown that food is a more important determinant of kangaroo dispersion than water and, combined with high mobility, kangaroo grazing patterns don't tend to be water-focused. The availability of forage, shade and safety from predators are stronger influencers of habitat use.

Red kangaroos are unevenly spread throughout arid Australia. They prefer open grassy plains with a few scattered trees to provide shade and shelter. Average weekly home ranges can be up to 370 ha with core use averaging around 80 ha. They will travel up to 30 km in response to patchy rainfall.

Eastern grey kangaroos are distributed through the east of Australia. Their main populations are in country with more than 250 mm annual rain, favouring tall eucalyptus woodlands with an understory of grass, bracken or shrubs. They prefer to forage close to shelter. Annual home ranges vary from 37-129 ha, with core ranges from six to 26 ha.

Western grey kangaroos live across southern Australia, from Western Australia through to western Victoria and NSW. Preferred habitat is scrub with heath and shrub and low woodland and they will move further away from cover to feed than eastern greys. Large males have home ranges about double those of females. Core home ranges for western greys are seven to eight hectares, with female home ranges expanding out to approximately 47 ha and males to 73 ha.

Reproductive biology

Under favourable seasonal conditions female kangaroos reach sexual maturity between 14 to 24 months depending on the species. The reproductive system of kangaroos is characterised by short gestation periods, averaging 33 days, with the development of young mostly occurring in the pouch. Almost immediately after producing young, the sexual cycle starts again, with females typically supporting a young at foot, developing pouch young and diapausing embryo at the same time.

Kangaroos are such specialised breeders that one of their teats will continue to produce high carbohydrate milk for the older joey, while the new baby attaches to a teat producing milk with higher fat content.

In times of extreme drought and starvation female kangaroos can practice birth control by pausing development of foetuses until conditions improve.

Management of kangaroo grazing in western NSW

Land managers in rangelands regions are required to manage natural resources responsibly, with the aim of at least maintaining – and where possible improving – range condition. In rangeland regions managing total grazing pressure (TGP) and spelling pastures are key tools for conserving groundcover, encouraging perennial native grass cover and building resilience to drought and climate change. Recent research has validated that gaining control of TGP and implementing rotational grazing systems, leads to improvement in land condition, productivity, biodiversity and soil carbon.

Total grazing pressure involves accounting for the grazing pressure from all managed and unmanaged herbivores utilising resources in a rangeland grazing system. Macropods and unmanaged goats are the principal unmanaged herbivores that need to be accounted for in TGP. Even though kangaroos are a native species, their populations require ongoing management as they have been unhitched from natural controls such as predation and the availability of surface water. Unlike goats, macropods rarely provide income for land managers. Kangaroo numbers are considered to be higher now than at the time of European settlement, particularly in the "sheep rangelands" where dingo (wild dog) numbers are relatively low. Current commercial harvesting takes have little impact on the size and density of kangaroo populations. Alternatively, fencing and water point control can provide non-lethal options for managing the impact of kangaroo grazing.

Note: the goal is to maintain healthy and sustainable populations of macropods while regaining control of grazing pressure and movement of unmanaged herbivores to improve the natural resource base. Compliance protocols for kangaroo management apply with regard to animal welfare, harvesting and culling. Current research is investigating the biodiversity and production impacts and opportunities presented by exclusion and cluster fencing projects.

Fencing and water point management

Total grazing pressure control through fencing, in combination with grazing management such as rotational grazing, is recommended best practice for restoring landscape function and grassland ecosystems in western NSW. Fencing provides a long-term solution to kangaroo management, countering large movements of animals in response to local rainfall patterns and providing scope for paddock spelling through exclusion.

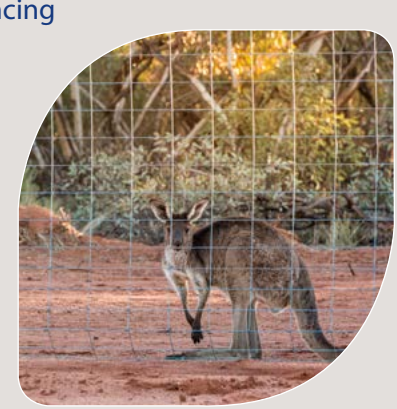
TGP Fencing

TGP mesh-type fencing based on products such as Hingejoint™ have been increasingly used in western NSW over the past decade to control unmanaged goats. Standard 1,200 mm high Hingejoint™ fencing will reduce kangaroo movement. Sensor camera footage demonstrates that all but the larger kangaroos tend to move along TGP fences or attempt to push under, rather than risk jumping over the wire. However, when stressed or under pressure, most kangaroos will attempt to clear the fence.

Cluster fences

A cluster group is an incorporated group of landholders cooperating to develop a multi-property pest management zone surrounded by a perimeter exclusion fence. The advantage of this approach is the reduction of cost per hectare with outcomes spread over broader areas. However, a body corporate entity is required to manage communal maintenance issues, compliance and collaborative management plans for wildlife and pests.

Multi-species exclusion fencing



In recent years there has been an increase in the construction of multi-species exclusion fencing, either in cluster groups, but also around individual properties. This type of fencing is proving to be very effective in controlling kangaroo grazing pressure.

Multi-species exclusive fences use a range of design types but typically include wire products with smaller mesh and heights of up to 1,500 mm in addition to outward facing wire aprons, making them extremely effective barriers for kangaroos as well as wild dogs, goats and feral pigs. These fences cost upwards of $8,000 to $9,000 per km to erect but landholders expect that increases in production and reductions of pest management costs will ensure that construction costs will be recouped within a few years.

Controlling access to water

Turning off or closing artificial water points upon de-stocking a paddock is part of an overall best practice approach to managing grazing pressure in rangeland regions. However, research has demonstrated that kangaroos are less constrained by water availability than livestock. In particular, the closure of waters has very limited impact on the grazing behaviour of red kangaroos. Closing waters would likely only result in reduced kangaroo density if all waters within proximity of home range were closed, forcing them to find a new home range.

Commercial Kangaroo Harvest

All Australian macropods are protected by law, however some species are so numerous in rural areas that they can be harvested or shot as pests. High levels of public debate about kangaroo management has ensured that operational aspects of kangaroo management, including research and monitoring, strive for world's best practice and public accountability.

Kangaroos in NSW are protected under the *Biodiversity Conservation Act 2016*. It is an offence to harm (including kill, injure or capture) a kangaroo or attempt to harm a kangaroo (including hunt, pursue or use anything for the purpose of harming) without a licence.

The NSW Kangaroo Management Program is aimed at ensuring sustainable population levels and that kangaroos are harvested in a humane way. Annual aerial surveys are conducted to estimate and monitor kangaroo populations and set sustainable harvest quotas. Quotas in NSW are currently set at 15 per cent (western and eastern grey kangaroos) and 17 per cent for red kangaroos.

Commercial harvesting is conducted by professional, accredited and licensed harvesters who must adhere to the National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes. All animals taken commercially must be appropriately tagged and every harvested kangaroo can be individually traced back to source properties through state based tagging and reporting systems.

Landholders must provide consent for commercial harvesters to harm kangaroos on their property. Public liability insurance is the responsibility of the landholder and the harvester.

Kangaroo products are currently exported to approximately 45 countries worldwide but the allowable quota for macropod harvesting has not been achieved in any state in recent years. Low harvest takes (approximately 20 per cent of quota, or three per cent of populations) mean that commercial kangaroo harvesting is not currently an effective tool for managing kangaroo populations. Increased social licence and markets for kangaroo products are required to shift perceptions of kangaroos so that they are valued as a resource rather than requiring management as a pest.

Non-commercial culling of kangaroos

In addition to commercial harvesting, states make provisions for landholders to apply for licences to harm kangaroos if they are shown to be damaging property.

Compliance

Permits are issued through NSW National Parks and Wildlife Service and culling must adhere to the National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Non-Commercial Purposes. Animals taken under these provisions cannot enter the commercial trade. Complaints about non-compliance can be made through National Parks.

In recognition of the impacts large numbers of kangaroos were having on land managers, the NSW government implemented reforms in August 2018 making it easier to apply for permits. Property size based cull limits were introduced as well as allowing more shooters under each licence and removing the need for carcass tags and "shoot and let lie" conditions.

Linking to professional or volunteer shooters

Landholders who wish to obtain contact details of a shooter in their region can go to the Local Land Services website for more information and to register online.

Best practice guidelines

The NSW Department of Primary Industries Game Licensing Unit has developed a best practice guide for shooters involved in non-commercial kangaroo culling.

Sustainability

The NSW government conducts monthly reviews of licences issued to both landholders and commercial harvesters to ensure that kangaroo populations remain within ecologically sustainable limits.

Animal welfare

The *Prevention of Cruelty to Animals Act* applies to harming kangaroos in NSW. Incidents of animal cruelty should be reported to NSW Police, RSPCA or Animals Welfare League NSW.

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